

In the Claims:

Cancel claim 1 after granting a filing date to the subject divisional application.

Cancel claims 2-6 without prejudice.

Add claims 7-22 as follows:

7. Apparatus for shingling successive sheet products cut from a substantially continuous web of sheet material, said apparatus comprising, in combination, a variable rotary cutter having a plurality of knife blades having cutting edges operative to cut the web generally transversely into irregularly spaced sheet products of substantially equal longitudinal lengths having leading and trailing edges, first conveyor means for receiving said sheet products in successive fashion from said rotary cutter and defining a first conveyor path along which said successive sheet products are conveyed in irregularly spaced relation at a first longitudinal speed, second conveyor means having an upstream end for receiving said sheet products in successive fashion from said first conveyor means and defining a second conveyor path along which said sheet products are conveyed at a slower longitudinal speed than said first longitudinal speed, knockdown means including at least one rotary knockdown wheel spaced above and generally adjacent said upstream end of said second conveyor means, said knockdown wheel having a plurality of knockdown members adjustable about an outer periphery of said wheel, said knockdown members being equal in number to the number of knife blades on said rotary cutter that establish said trailing edges of said irregularly spaced sheet products and being positioned about the outer periphery of said wheel so that outer surfaces of said knockdown members are operative to engage and depress successive sheet products generally adjacent their trailing edges as said irregularly spaced sheet products pass from said first to said second conveyor means whereby to enable shingling of successive sheet products, and means for rotating said knockdown wheel so that said outer surfaces

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cutter causes said knockdown elements to each engage a discrete printed product received from said first conveyor path generally adjacent its trailing edge to enable the leading edge of each successive printed product received from said first conveyor path to pass over the trailing edge of the preceding printed product in shingled fashion.

20. In apparatus for conveying irregularly spaced printed products from a first conveyor to a second conveyor traveling at a slower speed than the first conveyor, and wherein said printed products have leading and trailing edges and are formed by a rotary cutter from predetermined equal lengths of a continuous web so that each predetermined length of web has an equal number of irregularly spaced equal length printed products formed therefrom; the improvement comprising a knockdown wheel supported adjacent an upstream end of the second conveyor and operative to engage the trailing edge of each successive printed product as it is conveyed from said first to said second conveyor, said knockdown wheel having an axis of rotation and a substantially circular periphery, and a plurality of knockdown elements mounted on said periphery so as to enable selective angular adjustment of said knockdown elements about said axis of rotation, said knockdown elements being equal in number to the number of said printed products formed from each said predetermined length of web and being positioned so that upon rotating said knockdown wheel in predetermined phase relation to said rotary cutter, said knockdown elements engage said trailing edges of said irregularly spaced products conveyed from said first to said second conveyor.

21. A method for making a plurality of printed products from a continuous web, comprising the steps of:

effecting cooperation between the web and a rotatable print cylinder so as to create a plurality of generally equal length printed products on a repeat length of the web during each rotational repeat of said print cylinder and wherein the printed products are irregularly spaced

84 of said knockdown members have a tangential velocity substantially equal to the tangential velocity of said knife cutting edges during operation of said apparatus.

3. Apparatus as defined in claim 2 wherein said knockdown wheel has a center axis of rotation, said knockdown members being disposed in generally radial relation to said center axis.

4. Apparatus as defined in claim 3 wherein said knockdown members lie substantially in a common plane transverse to said axis of rotation of said knockdown wheel.

5. Apparatus as defined in claim 3 wherein said knockdown members include brush bristles defining said outer surfaces thereof.

6. Apparatus as defined in claim 2 including brake means for engaging an undersurface of the trailing edge of each successive sheet product as it is engaged by a knockdown member so as to assist in decelerating each said sheet product as it enters said second conveyor means.

7. Apparatus as defined in claim 2 including means for varying the rotational phase relation between said rotary cutter and said knockdown wheel so as to vary the point of engagement of said knockdown members with said sheet products relative to the trailing edges of said sheet products.

8. Apparatus as defined in claim 7 wherein said means for varying said rotational phase relation comprises a harmonic drive operatively associated with said rotary cutter and said knockdown wheel.

9. Apparatus as defined in claim 7 wherein said means for varying said rotational phase relation comprises a differential gear drive operatively associated with said rotary cutter and said knockdown wheel.

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1/5. Apparatus as defined in claim 1 including headstop means operatively associated with said second conveyor means so as to engage a leading edge of each successive printed product and effect deceleration thereof as said product passes to said second conveyor means, said headstop means being positioned to be engaged by the leading edge of a printed product when the trailing edge of said product is adjacent the upstream end of said second conveyor means.

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16. A system for producing printed sheet products, comprising, in combination, a rotary print cylinder operative to produce a plurality of printed products on a continuous length longitudinally moving web during each repeat of the print cylinder, a variable rotary knife cylinder downstream from said print cylinder and operative to sever the web generally transversely so as to create individual irregularly spaced printed products having leading and trailing edges, a first conveyor operative to receive said individual irregularly spaced printed products from said knife cylinder and convey said printed products at a first speed, a second conveyor operative to receive said irregularly spaced printed products from said first conveyor and convey said products at a slower speed than said first speed, headstop means operatively associated with said second conveyor for cooperation with each successive printed product to momentarily decelerate movement of each said successive printed product received from said first conveyor when the trailing edge of each said printed product is adjacent an upstream end of said second conveyor, and at least one knockdown wheel supported adjacent said upstream end of said second conveyor, said knockdown wheel having a plurality of kicker members disposed about its periphery equal to, or a whole integer multiple of, the number of printed products created by said print cylinder during each repeat revolution thereof, said knockdown wheel being positioned and rotated so that each kicker member engages the trailing edge of a printed product when the leading edge of said printed product engages said headstop means to facilitate shingling of successive printed products passing

from said first to said second conveyor.

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17. In a delivery system for receiving a printed web from a rotary print cylinder operative to print a plurality of equal length irregularly spaced printed products on each repeat length of the web, said system further including a variable rotary knife cylinder having a plurality of knife blades thereon positioned to sever each said repeat length of web so as to create irregularly spaced individual equal length printed products having leading and trailing edges, a first conveyor for conveying said individual printed products from said knife cylinder along a predetermined path at a first speed, and a second conveyor having an upstream end adapted to receive said printed products from said first conveyor and convey said products at a speed less than said first speed; the combination therewith comprising at least one knockdown wheel having a generally circular periphery and a center axis of rotation, said knockdown wheel having a plurality of knockdown elements supported about said periphery equal in number to the number of knife blades on said knife cylinder that establish said trailing edges of said printed products severed from said web, said knockdown wheel enabling adjustable positioning of said knockdown elements about said periphery in angular circumferential positions corresponding to the angular circumferential positions of said knife blades that establish said trailing edges, and means for supporting said knockdown wheel adjacent said upstream end of said second conveyor for rotation about said center axis in rotational phase relation to rotation of said knife cylinder such that said knockdown elements depress each successive printed product generally adjacent its trailing edge as said irregularly spaced printed products pass from said first to said second conveyor.

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18. The system as defined in claim 17 including at least one headstop roller cooperative with said second conveyor to define a nip operative to receive the leading edge of each successive printed product passing from said first to said second conveyor, said nip being operative to reduce

the speed of each successive printed product entering said nip when the trailing edge of said printed product underlies said knockdown wheel preparatory to being engaged by one of said knockdown elements.

19. Apparatus for making a plurality of printed products from a continuous web comprising, in combination, a rotary print cylinder, means for effecting cooperation between the web and said print cylinder so as to create a plurality of generally equal length printed products on a repeat length of the web during each rotational repeat of said print cylinder and wherein the printed products are irregularly spaced between a leading edge and a trailing edge of each repeat length of web, a rotary cutter having knife blades thereon, means for effecting cooperation between said repeat length of web and said variable rotary cutter so that said knife blades sever the web and create discrete irregularly spaced equal length printed products having leading and trailing edges, first conveyor means for conveying the severed irregularly spaced printed products from said rotary cutter along a first conveyor path at a first speed, second conveyor means for conveying the severed irregularly spaced printed products from said first conveyor path along a second conveyor path at a second speed less than said first speed, said second conveyor path having an upstream end positioned to receive said severed irregularly spaced printed products from said first conveyor path, and at least one knockdown wheel having an axis of rotation and a generally circular periphery and having a plurality of knockdown elements adjustable about said periphery, said knockdown elements being equal in number and positioned at substantially corresponding angular positions about said axis of rotation as are said knife blades on said rotary cutter that create said trailing edges of said printed products severed from said repeat length of said web, said knockdown wheel being positioned generally adjacent said upstream end of said second conveyor path so that effecting rotation of said wheel about said axis of rotation in predetermined phase relation to said rotary

between a leading edge and a trailing edge of each repeat length of web,

effecting cooperation between said repeat length of web and a variable rotary cutter having knife blades operative to sever the web so as to create discrete generally equal length irregularly spaced printed products having leading and trailing edges,

conveying the severed irregularly spaced printed products from said rotary cutter along a first conveyor path at a first speed,

conveying the severed irregularly spaced printed products from said first conveyor path along a second conveyor path at a second speed less than said first speed, said second conveyor path having an upstream end positioned to receive said severed printed products from said first conveyor path,

providing at least one knockdown wheel having a center axis and a generally circular periphery and having a plurality of knockdown elements adjustable about said periphery to correspond in number and angular relation to said knife blades on said rotary cutter that create said trailing edges of said irregularly spaced printed products severed from a repeat length of said web, and

positioning said knockdown wheel generally adjacent said upstream end of said second conveyor path and effecting rotation of said wheel about said center axis so that each of said knockdown elements engages a discrete printed product received from said first conveyor path generally adjacent its trailing edge so as to enable the leading edge of each successive printed product received from said first conveyor path to pass over the trailing edge of the preceding printed product in shingled fashion.

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22. A method for shingling printed products made from a continuous web having printed products formed thereon by a rotary print cylinder so that, for a repeat length of the web

having a leading end and a trailing end, a plurality of equal length printed products are irregularly spaced along said repeat length to create a waste strip at either said leading or trailing end thereof, said method comprising the steps of:

effecting cooperation between said repeat length of web and a rotary cutter having knife blades operative to sever the web and create discrete equal length, irregularly spaced printed products having leading and trailing edges,

conveying said discrete irregularly spaced products from said rotary cutter along a first conveyor path at a first speed to a second conveyor path operative to convey said products at a second speed less than said first speed, said second conveyor path having an upstream end positioned to receive said products from said first conveyor path,

providing at least one rotatable knockdown wheel having a plurality of knockdown elements adjustable about a rotational axis of said wheel so that said knockdown elements correspond in number and angular relation about said rotational axis to said knife blades on said rotary cutter that create said trailing edges of said printed products, and

positioning said knockdown wheel generally adjacent said upstream end of said second conveyor path and effecting rotation of said wheel so that each of said knockdown elements momentarily engages a discrete printed product adjacent its trailing edge as said product is received from said first conveyor path to enable the leading edge of the next successive printed product received from said first conveyor path to pass over said momentarily engaged trailing edge in shingled fashion.

This Preliminary Amendment accompanies a Petition to Make Special Under 37 C.F.R. § 1.102(d) that encloses prior patents known to applicants' and that may be material to examination of above claims 7-22. The prior patents comprise applicants' Information Disclosure Statement Under